What is claimed is:

1. A system for enabling efficient utilization of available bandwidth through overlapping adjacent channels comprising:

a receiver, for receiving a waveform having data information and noise information,

a filter bank, adapted to receive and filter said waveform and output channel information, said channel information including a combination of data signals and adjacent channel interference signals;

at least one demodulator, adapted to output an estimation signal representative of an estimation of at least one parameter of said channel information;

at least one decoder, adapted to calculate an estimated interference value based on said estimation signal; and

an interference canceler, adapted to estimate a data signal substantially without interference based on said output channel information and said estimated interference value.

2. The system of claim 1 further comprising:

one or more equalizers adapted to equalize the estimation signals from said at least one demodulator.

3. The system of claim 2 wherein said equalizers are in parallel with said at least one demodulator.

4. The system of claim 2 wherein said equalizers are in series with said at least one demodulator.

5. The system of claim 1 wherein said signal parameter comprises at least one of

a frequency parameter for determining a frequency value;

a timing parameter for determining a timing value;

a phase parameter for determining a phase value; and

a signal strength parameter for determining a signal strength value.

6. The system of claim 1 wherein said channels comprise carrier groups.

7. The system of claim 6 wherein said carrier groups comprise odd channels.

8. The system of claim 6 wherein said carrier groups comprise even channels.

9. The system of claim 1 wherein said relatively more accurate estimated data signal is fed back into said interference canceler for a predetermined number of iterations.

10. The system of claim 1 wherein said interference canceler is designed based on the minimum means square error criterion (MMSE).

11. The system of claim 1 wherein said interference canceler is equipped with feed-back coefficients to subtract the estimated interference and feed-forward coefficients to suppress the residual interference.

12. The system of claim 11 wherein the feed-forward and feed-back coefficients of the interference canceler are optimized in every iteration using the feed-back information, from said at least one decoder.

13. The system of claim 12 wherein, in another embodiment, the same feed-forward coefficients (matched filter coefficients) are used in all iterations to reduce the complexity involved in the optimization process.

14. The system of claim 1 wherein, in another embodiment, the interference canceler is designed using the maximum-a-posteriori (MAP) rule.

15. The system of claim 1 wherein said at least one decoder provides soft information to said interference canceler.

16. The system of claim 1 wherein said at least one decoder provides hard information to said interference canceler.

17. A method for enabling efficient utilization of available bandwidth through overlapping adjacent channels comprising:

receiving a waveform having data information and noise information,

receiving and filtering said waveform and output channel information, said channel information including a combination of data signals and adjacent channel interference signals;

estimating an output signal representative of an estimation of at least one parameter of said channel information via at least one demodulator adapted to receive said channel information;

calculating an estimated interference value based on said

output estimation signal via at least one decoder adapted to receive said output estimated signal; and

estimating a data signal substantially without interference based on said channel information and said estimated interference value via an interference canceler adapted to receive said signals to produce a more accurate data signal.

18. The method of claim 17, wherein soft-input/soft-output decoders are used to obtain the estimates of the data.

19. The method of claim 17, wherein soft-input/hard-output decoders are used to obtain the estimates of the data.

20. The method of claim 18, wherein the soft-input/soft-output decoders comprise at least one of

a Maximum a-posteriori (MAP) algorithm;

a Log-MAP algorithm; and

a Soft-output Viterbi (SOVA) algorithm.

21. The method of claim 17, wherein said channels comprise carrier groups.

22. The method of claim 21 wherein said carrier groups comprise odd channels.

23. The method of claim 21 wherein said carrier groups comprise even channels.

24. The method of claim 18 further including the step of

calculating subsequent estimated interference signals from said relatively more accurate data signals.

25. The method of claim 24 further including the step of feeding back said relatively more accurate data signals into said calculating step a predetermined number of times.

26. The method of claim 24 further including the step of repeating said feed back step to output increasingly accurate estimated data signals.

27. The method of claim 21 further including the step of:

equalizing said channel information with one or more equalizers adapted to receive said channel information from said demodulators.

28. The method of claim 17 wherein said signal parameter comprises at least one of

a frequency parameter for determining a frequency value;

a timing parameter for determining a timing value;

a phase parameter for determining a phase value; and

a signal strength parameter for determining a signal strength value.